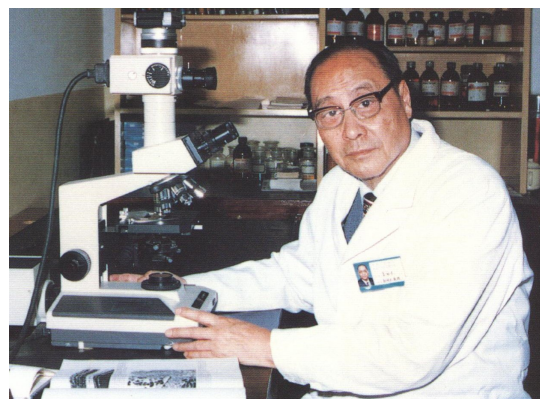


The Department of Otolaryngology Head and Neck Surgery, PLA General Hospital (national key academic unit) The PLA Institute of Otolaryngology (PLA key laboratory for acoustic trauma) The PLA Medical College Department of Deafness Education Key Laboratory

Led by four generations of leadership from late Prof. JIANG Sichang (academician, Chinese Academy of Engineering), Prof. YANG Weiyan (Honorary President, Division of Otolaryngology Head and Neck Surgery, Chinese Medical Association), Prof. HAN Dongyi (President Elected, Division of Otolaryngology Head and Neck Surgery, Chinese Medical Association) to now Prof. YANG Shiming (President, Division of Otolaryngologists, Beijing Medical Doctor Association), the PLA General Hospital Department of Otolaryngology Head and Neck Surgery has focused on prevention and treatment of deafness. Prof. JIANG started the department in 1959. Since then, by the efforts across several generations over more than half a century, the department has achieved great accomplishments in many areas including patient care, teaching and research. The department was made the Center of Otolaryngology by the PLA General Logistics Department and approved to award master degrees by the State Education Commission in 1978. Authorized by the PLA General Logistics Department, the PLA Institute of Otolaryngology was founded in 1987, which was rated as a national key academic unit by the State Education Commission in 1989 (and again in 2002) and as a PLA key laboratory by the PLA General Logistics Department in 1992. The department was granted a sub-specialty hospital status within the PLA General Hospital in 2008 and started building the Department of Deafness Education Key Laboratory in 2012. It was awarded the National "973" Project Chief Scientist unit status in the same year. The department now receives nearly 200,000 outpatient visits a year, and has expanded and branched into



Prof. JIANG Sichang

sub-specialties including otology, audiology medicine, rhinology, head and neck surgeries and pharyngolaryngology and voice disorders. It runs 200 beds and has 1200 m² research space supported by close to RMB 100,000,000 Yuan research funding for 148 important national and PAL projects. It has won over 100 science and technology progress awards at national and PLA levels. For many years, the department has been a model unit within the PLA General Hospital and its showcase unit for visitors. Today, as a subspecialty hospital that combines patient care, teaching and research, it enjoys its many sub-specialty divisions, well recognized services, deep talent reserves and strong expertise status, and provides first class care to patients from the military as well as the civilian population. Its graduates and trainees can now



Prof. JIANG Sichang,
chairman, 1959 - 1984

Prof. YANG Weiyan,
chairman, 1984 - 1998

Prof. HAN Dongyi,
chairman, 1998 - 2010

Prof. YANG Shiming,
chairman since 2010

be seen all over China and across the world and are actively contributing to the advance of otolaryngology and head and neck surgery.

Clinical services

Over the past decades, the department has focused on the treatment and research of deafness and has achieved great accomplishments. Currently, average daily outpatient visits to the department have reached close to 1,000. Despite the heavy work load and limited man power, the department strives to ensure the quality as well as the volume of its expert clinics on daily basis, to maintain high quality patient care and lab testing, and to secure its outpatient services as the first window and platform to providing effective services to patients. Its surgeons perform more than 5,000 surgical procedures each year, more than 30% of which are complex and/or high-risk cases. As its practice branches out, sub-specialties including microsurgical otology/neurotology, rhinology/minimal invasive skull base surgery, head/neck/skull base surgery, audiology medicine/head and neck oncology, laryngology/voice disorders, facial plastic and reconstructive surgery, and geriatric care have been established. Also created in the department are the auditory implant center, clinical audiology center, molecular deafness diagnosis center, dizziness management center, endoscopy center and voice medicine center. As the field of otology has rapidly developed, the traditional view of otology as a surgical discipline is challenged. A new sub-specialty - audiology medicine was first founded within the Department of Otolaryngology Head and Neck Surgery in June 2008, with its separated ward unit allocated in November 2010. This new sub-specialty unit has made great advances in management of hearing loss, tinnitus, dizziness and other inner ear diseases, as well as in managing head and neck oncology cases with combined therapies, and continues to explore a new path in internal medicine otolaryngology suitable for the Chi-

nese patient population.

The department has kept a leading position in the field of microscopic ear surgery. We were the first to perform inner ear fenestration procedures in the 1950s and first to perform stapedectomy in 1962 in China. We have performed more than 6,000 stapes procedures and more than 20,000 cases of middle ear surgeries to date with high effective rates. In auditory implantation, we have built a systematic diagnostic and therapeutic approach including pre-operative evaluation, minimal invasive cochlear implantation, post-operative programming, speech rehabilitation, and genetic testing and consultation, by an expert team. Since our first multi-channel cochlear implantation in 1996, we have completed over 1,700 cases and we are among the first to adopt new auditory implantation technologies (e.g. Vibrant Soundbridge and BAHA) and have become the largest auditory implantation center in China. Diagnosis and treatment of neurotologic diseases is another feature of this department. Our group has performed nearly 350 cases of acoustic neuroma resection (complete resection in 98%) since the 1980s and we are in a leading position in facial and auditory function preservation in China. We have also built leading positions in skull base surgery, rhinology and voice disorder treatment in China. The practice scope of our head and neck surgery group covers treatment of extensive malignancies and benign lesions of the larynx, hypopharynx, temporal bone and infratemporal fossa, including procedures such as total and subtotal temporal bone resection, extended temporal bone resection, resection of jugular glomous tumors via a combined temporal-cervical approach, and resection of petroclival tumors, CPA meningioma, cholesteatoma and choroidal tumors. Our efforts have saved many lives and are appraised by colleagues as well as patients. In addition to managing common nasal diseases, our rhinology group has also expanded its practice to cover anterior skull base and orbital surgeries. Our laryngology group performs various microscopic vocal cord procedures and voice change surgeries. It also



Prof. JIANG Sichang and YANG Weiyuan
in the 1970s



Prof. YANG Weiyuan and HAN Dongyi
in the 1990s



Prof. YANG Weiyuan and YANG Shiming
in 2010



Entire staff of the department in the 1970s

provides polysomnography evaluation for sleep apnea and is the first in China to use da Vinci robot-assisted surgical system in treating sleep apnea with satisfying results. The group has also published multiple books and multi-media materials on voice disorders and voice surgeries. As the department practice continues to expand with rapidly increasing patient visits and surgery volumes and no man power supplement, the department leadership has taken measures to boost the sense of responsibility and service among personnel at various posts, which helps maintaining a positive attitude among the staff. In dealing with heavy workloads, the department advocates its senior faculty as models and relies on young and middle aged surgeons as the engine work force to ensure continuous improvement in patient care quality and to achieve great success in both service and financial gains.

Education

We were authorized by the State Education Commission to award master's degrees in 1978 and 61 have graduated from our master's program. We were authorized to award doctoral degrees by the Commission in 1983 and 70 have received their doctoral degrees from our program. The post-doctoral program was started in 1992 which has provided training to 8 post-doctoral fellows. We have also trained 32 graduate students by contract, more than 50 PLA Medical Foundation students, and near 1,000 fellows. Among graduates from our master's and doctoral programs are some senior scientists in Ministry of Science and Technology Key Scientific Research Project (i.e. the "973" Project), winners of National Natural Science Funds for Distinguished Young Scholars grants, winners of PLA Outstanding Talents Awards, winners of national and PLA best doctoral dissertation awards, and winners of outstanding master's dissertation awards. The department staff consists of patient care, teaching and research personnel with innovative thinking and capabilities. Of its staff, 17 hold professorship level and 18 hold associate professorship level rankings. More than 85% of its senior staff are doctoral graduates, with each of them focused on and contributing in a field of his/her interests. In the 1990s, the late Prof. JIANG Sichang was awarded the "Model Medical Professor" title by the Central Military Commission. At the beginning of the 21st century, Prof. YANG Weiyan was awarded the "Bole Award" by the PLA General Logistics

Department. Profs. HAN Dongyi and YUAN Huijun are winners of National Natural Science Funds for Distinguished Young Scholars grants. Drs. HANG Dongyi, DAI Bu and WANG Qiuju are winners of the China Association For Science and Technology "Qishu Practical Engineering Awards for Young Scholars". Drs. HAN Dongyi, YANG Shiming, WANG Qiuju, DIA Bu, ZHAO Hui, HUANG Dongyan, HOU Zhaohui, YUAN Yongyi and WANG Jianguo are winners of PLA General Logistics Department "Silver Star of Science and Technology" and "Rising Star of Science and Technology" awards or "Beijing Rising Star of Science and Technology" awards. The department continues to build a momentum of advance and growth and will continue to play increasingly influential roles in the advance of patient care and research in otolaryngology head and neck surgery in China.

The department currently has 4 post-doctoral fellow mentors, 11 doctoral student mentors, 7 master's student mentors and 13 fellow mentors. Over the decades, we have provided classes for fellows and residents on every Thursday evening. Many fellows become senior faculty and leaders of their practice groups after graduation from our programs. We have sent more than 60 people overseas for lecturing, fellowship studies and presentations at international meetings. We have hosted more than 500 international visitors. We have engaged in extensive academic exchanges with institutions across the world and have enlisted 12 overseas scholars as guest professors.

The chairman of the department has traditionally provided bedside rounds teaching including weekly teaching rounds and semi-monthly grand rounds, as well as difficult case discussions. At these discussions, attendees are engaged in analysis of patient history and test results and formulating opinions of best possible management plans for the patient's maximal benefits, based upon review and discussion of all potential options. It is owing to such activities that the risk of potentially fatal neck abscess and mediastinum infection in a patient with hypopharyngeal foreign body was identified in time for an emergency drainage procedure to save his life. In another case of foreign body in the nasopharyngeal skull base area, an operation plan via an ear-nose combined approach formulated from such discussions ensured safe removal of the foreign body. Chairman grand rounds and difficult cases discussions in this department have become effective learning and exchange experiences for staff at all levels. The department has also organized international academic activities including the



Expert Discussion



Some department staff in 2010

“Beijing International Forum of Deafness and Genetic Medicine” and “Beijing International Symposium of Otolaryngology”, which have helped promoting its academic influences. In addition, the department has sponsored a number of national level continuous education projects, including “Advanced Training Class of Microscopic Ear Surgery and Neurotology”, “Training Class of Head and Neck Anatomy and Temporal Bone Surgery”, “Training Class of Clinical Diagnostic Audiology”, “Training Course of Deafness Gene Diagnosis”, “International Advanced Training Class of Audiology Medicine”, “Workshop of Nasendoscopy and Skull Base Minimal Invasive Surgery” and “Training Course of Voice Medicine and Minimal Invasive Laryngeal Surgery”, which have attracted attendance of experts and students from both China and abroad and served as an effective platform for exchanges between the department and colleagues from China and across the world.

Research

In 1959, the late Prof. JIANG Sichang opened the first laboratory in the PLA General Hospital with a mere 8 m² space. Through development across more than half a century, the PLA Institute of Otolaryngology now has nine functional laboratories including a temporal bone pathology laboratory, a auditory and balance physiology laboratory, an otoneurobiology center, and deafness molecular diagnosis center, a molecular genetics laboratory, and the PLA Central Station of Medical Acoustic Measurement and Testing, with equipment valued over RMB 40,000,000 Yuan. The institute has conducted systematic studies on deafness from the aspects of molecular biology, cellular biology, embryo development and genetics, morphology and physiology and clinical audiology. Our studies have resulted in numerous breakthroughs in inner ear hair cells regeneration: 1) the first proof of tip-links self-repair following

injury to cochlear hair cell cilia, which provides important theoretical basis for gene therapies of deafness. The work was published in a prestigious neuroscience journal, reported a “waterfall” effect in pathology of hearing damage, proposed a four-stage hearing damage pathology theory and gene therapy time window and a strategy of gene therapy to promote hair cell regeneration; 2) innovative breakthroughs in deafness gene and molecular therapies. The Math1 gene was found to induce regeneration of hair cell cilia with noticeable hearing improvement. The work was first reported at the ARO annual meeting with great interests and subsequent studies, and later published on PLoS One in 2012. The work also found that combined use of the Math1 gene and DAPT led to greatly increased numbers of hair cells in newborn rats, and that this effect was different at different locations in the cochlea with variable effects on cilia development. In collaboration with the National Center for Nanoscience and Technology, our group has successfully developed a new nanovector, laying a foundation for future clinical application of gene therapy for deafness; 3) discovery of new deafness mechanisms. We were the first to report smad5 as a key gene in aging of hearing and the work was published in Developmental Neurobiology. We also found that smad4 defects led to profound hearing loss. This work was published in Developmental Dynamics and generated great interests from China and the world. The work discovered that smad4 defect led to severe abnormality in the development of inner hair cell ribbon synapses. This discovery is important for the diagnosis and treatment of auditory neuropathy -a difficult clinical challenge, allows for new classification of auditory neuro-ma, and has led to a new concept in hearing restoration strategy based upon different etiology locations in auditory neuropathy; 4) new advances in auditory stem cell research; Our in vivo works have shown that mesenchymal stem cells can be induced to



differentiate into hair cell-like cells. We have shown that embryo stem cells can be transported into the cochlea via fenestration in the basal cochlear turn with good survival rate and minimal damage to the inner ear. ESCs introduced after ototoxic injury can migrate to the basilar membrane and vestibule and differentiate into hair cell-like cells and inner ear neural cells. This work shows a new horizon in cellular therapy for deafness. Led by Prof. YANG Shiming as the senior scientist of the “973” Project, his team has been awarded a greater than RMB 20,000,000 Yuan grant for the project of “clinical and basic research studies on stem cell therapy for sensorineural hearing loss”.

Our research in deafness genes has been in a leading position in China in recent years. Our research platform covers deafness physiology, pathology, neurobiology, molecular biology and molecular genetics, and includes the largest temporal bone bank in Asia, an audiology database and a DNA gene bank. Funded by more than 80 grants from the National Natural Science Foundation and the “973” and “863” Projects, focused on molecular genetics mechanisms of deafness, and supported by the abundant hereditary deafness resources in China, we have systematically conducted research on deafness regarding its causal genes, pathogenesis mechanisms, and clinical detection and intervention, which has attracted attention in the field and promoted research on hereditary deafness in China toward the international levels. These works won the second prize of National Award for Science and Technology Progress in 2008 for: 1) consecutive discoveries of two deafness genes based upon completion of Chinese Population Hereditary Deafness Database, which facilitated new breakthroughs in research on mechanisms of deafness; 2) the first report of a new Y-linked inheritance pattern in hereditary deafness, which is an important supplement to the theory of hereditary deafness; 3) establishment of theories and methodologies in prevention of severe sensorineural hearing loss and in birth defect intervention and their successful application in prevention and intervention in new born deafness; 4) completion of a national molecular epidemiological survey on deafness; 5) important progress in studying molecular mechanisms of ototoxic hearing loss for its prevention and treatment; 6) establishment of a database of presbycusis that allows studies on hereditary susceptibility to age-related hearing loss at various levels; 7) proposal of a concept of adding deafness gene testing to newborn hearing screening protocols and exploration of strategies and methodologies in combined hearing and gene screening in newborns; and 8) establishment of the PLA General Hospital Molecular Diagnosis Center for Deafness, which pioneered utility of molecular diagnosis of deafness, such as development and

application of 14 patents including the “Mitochondrial DNA A1555G Mutation Test kit”, “Jingxin 1 Hereditary Deafness Genes Diagnosis Chip Kit” and “Newborn Deafness Genes Fast Screening Test Kit”.

Our department has been funded for 148 various research projects including the National Key Technology R&D Program projects, National Natural Science Foundation projects, PLA “VIIth through XIIth Five Year Plans” key projects, National “Xth Five Year Plan Mandatory Key Technology R&D Program projects, Ministry of Science and Technology Key Technology R&D Program projects, “973” projects, “863” projects, Special Foundation for Outstanding Doctoral Graduates projects, NIH funded projects and Natural Science Foundation of Beijing projects, worth over RMB 90,000,000 Yuan. Through these works, achievements have been accomplished on pathogenesis, prevention and treatment of noise-induced hearing loss, ototoxic hearing loss, sudden deafness and hereditary deafness, cloning of deafness genes, hearing screening in newborns, pre-natal screening of hereditary deafness, auditory implantation, neurotology, lateral skull base surgery, head and neck surgery, nasal surgery, voice surgery and biological therapies for deafness. Its faculties and scientists have published 1543 papers, including more than 150 indexed in SCI with the highest impact factor at 12.34, and 38 books. Among the over 100 honors awarded to the department are 4 second and 1 third prizes of National S&T Progress Award, 1 second prize of Department of Education S&T Progress Award, 2 first and 24 second prizes of PLA S&T Progress Award, and 1 first and 3 second prizes of Beijing S&T Progress Award.

In addition to continuously improving patient care, teaching and research, the department created the “Chinese Journal of Otology” in 2003 and the sole English language otology journal in Asia - the “Journal of Otology” in 2006. The Chinese Journal of Otology is now indexed by Chinese Core Periodicals, Chinese Science and Technology Core Periodicals and Chinese Science Citation Database. Through its more than a decade’s efforts, the journal has built its distinct columns, with increasing influences. Its impact factor ranks first among the 25 ENT journals in China, with the highest numbers of grant funded papers. It is a must read for Chinese otolaryngologists.

Following the foregoing generations of leaderships under Profs. JIANG Sichang, YANG Weiyan and HAN Dongyi, it is expected that the fourth generation leader - Prof. YANG Shiming will lead the PLA General Hospital Department of Otolaryngology Head and Neck Surgery in writing its new ever more glorious chapters.

